



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

May 31, 2012

Mr. Barry S. Allen, Vice President  
Davis-Besse Nuclear Power Station  
FirstEnergy Nuclear Operating Company  
5501 North State Route 2  
Oak Harbor, OH 43449

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
DAVIS-BESSE NUCLEAR POWER STATION LICENSE RENEWAL  
APPLICATION RELATED TO PRESSURE-TEMPERATURE LIMITS  
(TAC NO. ME4640)

Dear Mr. Allen:

By letter dated August 27, 2010, FirstEnergy Nuclear Operating Company submitted an application pursuant to Title 10 of the *Code of Federal Regulations*, Part 54 for renewal of Operating License NPF-3 for the Davis-Besse Nuclear Power Station. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the enclosure. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Steven Dort, of your staff, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me by telephone at 301-415-2277 or by e-mail at [brian.harris2@nrc.gov](mailto:brian.harris2@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "B.K.H.", written over a light blue horizontal line.

Brian K. Harris, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure:  
As stated

cc w/encl: Listserv

DAVIS-BESSE NUCLEAR POWER STATION  
LICENSE RENEWAL APPLICATION  
REQUEST FOR ADDITIONAL INFORMATION  
RELATED TO PRESSURE-TEMPERATURE LIMITS

**RAI 4.2.2-4 – Pressure-Temperature (P-T) Limits**

Background:

The Davis-Besse License Renewal Application (LRA), Section 4.2.4 describes the time-limited aging analysis for the P-T limit curves at Davis-Besse. As stated in LRA Section 4.2.4, the Davis-Besse P-T limit curves are established in a P-T Limits Report (PTLR), the contents of which are controlled in accordance with Technical Specification (TS) 5.6.4 requirements. The current Davis-Besse PTLR contains P-T limit curves that are valid through 32 effective full power years of facility operation. LRA Section 4.2.4 states that the P-T limit curves, as established in the PTLR, will be updated as necessary in accordance with TS 5.6.4 requirements and managed for the period of extended operation, as part of the Reactor Vessel Surveillance Program (LRA Appendix B, Section B.2.35), in accordance with the requirements of 10 CFR 54.21(c)(1)(iii).

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix G, "Fracture Toughness Requirements," states, "*this appendix specifies fracture toughness requirements for ferritic materials of pressure-retaining components of the reactor coolant pressure boundary (RCPB) of light water nuclear power reactors to provide adequate margins of safety...*" In addition, 10 CFR Part 50, Appendix G, Paragraph IV.A states that, "*the pressure-retaining components of the RCPB that are made of ferritic materials must meet the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), supplemented by the additional requirements set forth in ["paragraph IV.A.2, "Pressure-Temperature (P-T) Limits and Minimum Temperature Requirements"]...*" Therefore, 10 CFR Part 50, Appendix G requires that P-T limits be developed for the entire RCPB, consisting of ferritic RCPB materials in the reactor vessel (RV) beltline (neutron fluence  $\geq 1 \times 10^{17}$  n/cm<sup>2</sup>, E > 1 MeV), as well as ferritic RCPB materials not in the RV beltline (neutron fluence <  $1 \times 10^{17}$  n/cm<sup>2</sup>, E > 1 MeV).

Issue:

P-T limit calculations for ferritic RCPB components that are not RV beltline shell materials, may define curves that are more limiting than those calculated for the RV beltline shell materials. This may be due to the following factors:

1. Some ferritic RCPB components that are not RV beltline shell materials, such as nozzles, penetrations, and other discontinuities, are complex geometry components that exhibit significantly higher stresses than those for the RV beltline region. These higher stresses can potentially result in more restrictive P-T limits, even if the reference temperature (RT<sub>NDT</sub>) for these components is not as high as that of RV beltline materials that have simpler geometries.

2. Ferritic RCPB components that are not RV beltline shell materials may have material properties, in particular initial  $RT_{NDT}$  values, which may define more restrictive P-T limits than those for the RV beltline shell materials.

Request:

Describe how the P-T limit curves to be developed for use in the period of extended operation, and the methodology used to develop these curves, considered all ferritic RCPB materials, consistent with the requirements of 10 CFR Part 50, Appendix G.

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Sincerely,

*/RA/*

Brian K. Harris, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure:  
As stated

cc w/encl: Listserv

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Letter to Barry S. Allen from Brian K. Harris dated May 31, 2012

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DAVIS-BESSE NUCLEAR POWER STATION RELATED TO PRESSURE-  
TEMPERATURE LIMITS (TAC NO. ME4640)

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